

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
AD-A208 363		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.	
		5. MONITORING ORGANIZATION REPORT NUMBER(S) AFOSR-TR- 89-0657	
a. NAME OF PERFORMING ORGANIZATION Univ of Washington	6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION AFOSR/NP	
8. ADDRESS (City, State, and ZIP Code) Seattle, WA 98195		7b. ADDRESS (City, State, and ZIP Code) Building 410, Bolling AFB DC 20332-6448	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION AFOSR	8b. OFFICE SYMBOL (If applicable) NP	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR-86-0250	
8c. ADDRESS (City, State, and ZIP Code) Building 410, Bolling AFB DC 20332-6448		10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO. 61102F	TASK NO. 2917
		WORK UNIT ACCESSION NO. A6	
11. TITLE (Include Security Classification) (U) ANTIPROTON AND MILLIMETER WAVE RESEARCH			
12. PERSONAL AUTHOR(S) Dr Gerald Gabrielse			
13a. TYPE OF REPORT FINAL	13b. TIME COVERED FROM 30 Jul 86 to 29 Mar 88	14. DATE OF REPORT (Year, Month, Day) 26 Jan 89	15. PAGE COUNT 2
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		21.05	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
Equipment was purchased under the DoD University Research Instrumentation Program. The equipment is being used in an ongoing program to measure the mass of the antiproton.			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED / UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USES		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL R E KELLEY		22b. TELEPHONE (Include Area Code) (202) 767-4908	22c. OFFICE SYMBOL AFOSR/NP

DD FORM 1473, 84 MAR

83 APR edition may be used until exhausted.

All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE

UNCLASSIFIED

89 6 01 044

AFOSR-TK. 89-0657

FINAL REPORT

UNIVERSITY OF WASHINGTON

DOD Instrumentation Grant AFOSR-86-0250

The DOD Instrumentation Grant was used to purchase equipment for antiproton experiments and for the production of high frequency microwaves. The antiproton experiments are being supported by the Air Force Office of Scientific Research. They are progressing very nicely. In particular, we have recently cooled antiprotons below 1 eV in energy. Before we started these experiments, the lowest energy antiprotons available had kinetic energies 5 million times higher. The purchased equipment was essential to the antiproton experiments and is being very heavily used. The final version of the millimeter microwave system is completed. It is working although there are still some problems remaining. Hopefully, they will be fixed soon so that the microwave system can be used in the electron experiments described in the proposal.

The equipment monies were spent essentially as proposed. Looking over the list this is not completely obvious on the less expensive items. In the bid process, some of the manufacturers were changed. Also, much of the the equipment was assembled from smaller pieces. The exact mix of items purchased to form the millimeter microwave system, for example, was carefully researched before the order was placed in order to determine the optimum mix. In all cases, however, the final assembled system was that described in the proposal and the assembled equipment is in all cases being used for the experiments described.

☒
☐
☐

odes

and/or

Special

A-1

PO #	VENDOR		COST
200881	NALORAC	NITROGEN BORE AND VACUUM SYSTE	4200.06
232922	GRANVILLE PHILLIPS	CONTROL FOR CONVECTION GUAGE S	5027.53
624008	FEMTOSECOND	PHASE NOISE DETECTOR	2800.75
624020	HP	3561 SIGNAL ANALYZER	12205.40
628089	CUSTOM MICROWAVE	TUNABLE CAVITY FILTERS	4600.7
627534	COLUTRON	ION GUN SYSTEM	15061.85
628485	ALCATEL	TURBO PUMP	7806.50
628986	VNR	DIRECT DRIVE, VACUUM PUMP	1408.1
630473	UTE MICROWAVE	ISOLATOR	843.5
630480	MIDWEST MICROWAVE	1008 COUPLER	461.53
630489	RHG	MIXER, LOW NOISE DIODE TYPE	1830.64
630495	SAGE LAB	DC BLOCK, PHASE SHIFTER	2205.48
630868	NALORAC	SUPERCONDUCTING MAGNET	101891.00
631031	EQ & G	AMPLIFIER, HIGH FREQUENCY LOCK	7225.33
636026	NBS	LOW PHASE NOISE MICROWAVE SYST	8000
643925	HP	MW SPECTRUM ANALYZER, DISPLAY,	55403.94
643925	HP	IF SECTION, INTERFACE,	
643925	HP	FREQUENCY REF., MIXER, PLOTTER	
648808	ZENITH	LAB TOP COMPUTER	2021.75
663925	STANDARD WIRE	COAX CABLE	155.53
663927	ACACIA VNR	COAXIAL CONNECTORS	800.07
665973	EDUC COOP	DIGITAL STORAGE OSCILLOSCOPE	3382.52
674150	RF POWER	HIGH POWER RF AMPLIFIER	1948.25
679858	EICHER RICHARDS	CHART RECORDER	1821.85
679941	JANEL LAB	AMPLIFIER CHAIN PARTS	677.19
682500	SCHONSTEDT INST	FLUXGATE MAGNETOMETER	6782.81
682670	HEWLETT PACKARD	SYNTHESIZED SIGNAL GENERATOR	49649.8
683694	INSULATOR SEAL	FEED THRU	2438
685010	DYNAMIC	FALCO TERMINAL	2215.85
686128	RAD IND	LASERJET PRINTER	4122.94
688900	INTL BUS MACH	PS/2 MODEL 50 COMPUTER	2081.51
688947	PTS	FREQUENCY SYNTHESIZER	10088.76
690485	FLUKE	HIGH VOLTAGE PULSER SUPPLY	2632.14
690808	FLUKE	DIGITAL MULTIMETER	1461.36
690816	FLUKE	732A DC REFERENCE STANDARD	2002.51
690804	KEITHLEY	602 ELECTROMETER	3088.20
691328	HP	3314A FUNCTION GENERATOR	4983.46
691469	EICHER RICHARDS	CHART RECORDER	1883.23
691471	BALL	LOW NOISE RUBIDIUM FREQUENCY S	16189.14
691614	PHILLIPS SCI	QUAD GATE RELAY UNIT	1800.42
694548	ADAMS RUSSELL	HIGH PERFORMANCE AMPLIFIER	466.06
694579	AMER. MAGNETIC	LIQUID HELIUM LEVEL SENSOR	294.84
696841	STANFORD RSCH	PULSE GENERATOR	3347.14
696851	STANFORD RSCH	SINGLE PHASE LOCK IN AMPLIFIER	3345.78
698087	MINI CIRCUITS	ELECTRONIC ATTENUATORS, ETC	585.8
698848	AMERICAN MAGNETIC	SAMPLE & HOLD LIQUID HELIUM LE	671.88
699142	VANGUARD	SOLDERING STATION AND PARTS	297.74
699774	VANGUARD	20V 2A POWER SUPPLY	338.94
699823	EDUC COOP	100 MHZ OSCILLOSCOPE	1701.82

DISCLAIMER NOTICE

**THIS DOCUMENT IS BEST QUALITY
PRACTICABLE. THE COPY FURNISHED
TO DTIC CONTAINED A SIGNIFICANT
NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**